

Curriculum Vitae

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History of Employment

National Center for Atmospheric Research, Boulder, CO	
Scientist III	2003 to present
Scientist II	1998 to 2003
Scientist I	1994 to 1998
Forschungszentrum Jülich, Germany	
Staff Scientist	1993 to 1994
National Center for Atmospheric Research, Boulder, CO	
Scientific Visitor	1993 to 1993
Postdoctoral Fellow	1992 to 1993
Forschungszentrum Jülich, Germany	
Research Assistant/Graduate Student	1987 to 1992

Degrees

Ph.D. in Atmospheric Chemistry (Dr.rer.nat.)	1992
Supervisor: Prof. Dr. D. Kley <i>Bergische Universität</i> , Wuppertal, Germany, and <i>Forschungszentrum Jülich</i> , Germany.	
Master's degree in Chemistry (Diplom-Chemiker)	1988
Supervisors: Prof. Dr. K.H. Becker, Prof. Dr. D. Kley <i>Bergische Universität</i> , Wuppertal, Germany, and <i>Forschungszentrum Jülich</i> , Germany.	

Summary of Research Experience

Atmospheric Chemistry Division, National Center for Atmospheric Research (NCAR), Boulder, Colorado:

- Served as co-lead investigator for FRAPPÉ mission (with Gabriele Pfister, NCAR) and lead aircraft scientist on NCAR/NSF C-130, based in Colorado (summer 2014).

- Coordinated FRAPPÉ experiment with NASA DISCOVER-AQ, the Colorado Department of Public Health and the Environment, US EPA Region 8, NOAA, and several University Groups.
- Nominated for the 2015 AGU Edward A. Flinn III Award (with Gabriele Pfister, NCAR, and Jim Crawford, NASA) for coordination of the FRAPPÉ and DISCOVER-AQ activities with local agencies and University partners.
- Secured \$2M funding from the State of Colorado for University Partner participation in FRAPPÉ.
- Served as mission scientist on the NCAR/NSF GV aircraft for selected flights during the Deep Convection, Clouds, and Chemistry (DC-3) experiment, based in Kansas (summer 2012).
- Shared responsibility for a number of community aircraft instruments (for chemical tracers) housed in ACD and partially supported by NCAR-EOL / HAIS as part of the new Atmospheric Chemistry Center for Observational Research and Data (ACCORD).
- Provided support for airborne and ground based field missions through basic tracer measurements.
- Designed and implemented research instrument improvements (including a new, high efficiency NO₂ photolysis converter).
- Actively supported university and other agency groups during aircraft deployments using NCAR aircraft, including new HIMIL inlet design for reactive gases.
- Helped train new aircraft investigators on the NCAR/NSF C-130 mission scientist tools, developed tools for flight planning, and helped facilitate interaction with pilots.
- Co-led the NCAR participation in the Ocean, Atmosphere, Sea Ice, Snowpack (OASIS) 2009 Barrow intensive, including implementation of the experiment infrastructure and organization of logistics.
- Served as group leader, Community Airborne Research Instrumentation (CARI) group, Atmospheric Chemistry Division, NCAR (2007-2011).
- Served as mission scientist on NCAR/NSF C-130 aircraft during MIRAGE-Mex aircraft field mission conducted in Mexico City (spring of 2006).
- Designed, constructed and deployed instrumentation for the airborne measurement of peroxy acyl nitrates (PANs). Served as principal investigator for aircraft measurements of PAN and homologues on a number of airborne air quality and global exploratory missions led by NCAR, NOAA and NASA, including SOS, TexAQS I and II, ITCT 2K2, ICARTT, TRACE-P, INTEX-A and B, TOPSE and others (1999 to present).
- Investigated atmospheric chemistry of and measured reactive organic nitrogen compounds, non-methane hydrocarbons and halogenated organics from whole air samples. Participated in NASA, NOAA, and NCAR led aircraft missions, including STRAT, POLARIS, TRACE-A, PEM-Tropics A and B, and others (between 1995 and 1999).
- Characterized a new GC-NICI-MS system for the ambient measurement of mono- and multifunctional alkyl nitrates. Performed ambient measurement of mono- and multifunctional alkyl nitrates. Investigated kinetics and mechanisms of alkyl nitrate formation in the troposphere (1992-93, 1994).

Forschungszentrum Jülich, Germany

- Designed and constructed an automated gas chromatograph for the measurement of light hydrocarbons on a mobile platform. Supervised one graduate student and one undergraduate student. Helped in the preparation of a joint research project between Forschungszentrum Jülich and the Volkswagen AG for the on-road measurement of automobile emissions (Germany, 1993-1994).
- Designed and constructed a novel, coupled gas chromatograph-chemiluminescence instrument for the speciated measurement of alkyl nitrates in the atmosphere. Conducted the first long-term

series of ambient measurements of alkyl nitrates in Europe (TOR-Station Schauinsland, Germany, 1988-1992).

- Measured NO_x, Ozone, peroxy radicals and meteorological parameters to determine the influence of power plant emissions on the local ozone photochemistry (near Jülich, Germany, 1986).

Community Service

National and International Committees

- GAW (Global Atmospheric Watch) Scientific Advisory Group Reactive Gases (2015-present).
- TAbMEP (Tropospheric Airborne Measurements Assessment Panel, NASA, 2007-2011).
- OFAP (Observational Facilities Assessment Panel, NCAR/NSF, CARI group representative, 2007-2011).
- GAW (Global Atmospheric Watch) NO_x measurement expert panel, 2007-2010.
- Served as the ACD representative on the NCAR Scientist Assembly Executive committee (2009-2013).

Education and Outreach

- Served as thesis adviser at NCAR for to date ten chemical engineering students from Germany.
- Helped with numerous outreach projects during field missions and at NCAR (open houses, facility tours, workshops, public presentations).
- Presented basic atmospheric chemistry / measurement instrumentation lectures and gave aircraft tours during the NCAR Research Experience for Teachers Institute (RETI).
- Served as program mentor for students in NCAR's Significant Opportunities in Atmospheric Research and Science (SOARS) program.
- Mentored and served as liaison for teacher and student field deployment participation (OASIS and DC-3). Helped with public outreach events, public presentations, and science demonstrations.
- Lectured to a Graduate Level class in Atmospheric Chemistry at North Carolina A&T University.
- Guest Editor for the Elementa special feature "Reactive Gases in the Global Atmosphere."

Honors and Awards

- NASA Group Achievement Award 2008 – ARCTAS project
- NASA Group Achievement Award 2006 – INTEX-B project
- NASA Group Achievement Award 1997 – POLARIS project

Bibliography

Thesis

1. Flocke, F., Kopplung eines Chemolumineszenzdetektors mit einem Gaschromatographen zur selektiven Messung oxidierter Stickstoffverbindungen in der Atmosphäre. (1988) Master's Thesis, Forschungszentrum Jülich. Report # Jül-2217.
2. Flocke, F., 1992: Messungen von Alkylnitrat (C₁-C₈) am Schauinsland im Schwarzwald - Ein Beitrag zur Bilanzierung der photochemischen Ozonproduktion. Dissertation, FB 9 - Chemistry, Bergische Universität, Wuppertal, Germany and Forschungszentrum Jülich, Jülich, Germany.

Refereed Journal Articles

1. Flocke, F., A. Volz-Thomas, and D. Kley, 1991: Measurements of alkyl nitrates in rural and polluted air masses. *Atmos. Environ.*, **25A**, 1951-1960.
2. Kames, J., U. Schurath, F. Flocke, and A. Volz-Thomas, 1993: Preparation of Organic Nitrates from Alcohols and N₂O₅ for Species Identification in Atmospheric Samples. *J. Atmos. Chem.*, **16**, 349-359.
3. Jaegle, L., D. J. Jacob, P. O. Wennberg, C. M. Spivakovski, T. F. Hanisco, E. J. Lanzendorf, E. J. Hints, D. W. Fahey, E. R. Keim, M. H. Proffitt, E. Atlas, F. Flocke, S. M. Schauffler, C. T. McElroy, C. Midwinter, L. Pfister, and J. C. Wilson, 1997: Observed OH and HO₂ in the upper troposphere suggest a major source from convective injection of peroxides. *Geophys. Res. Lett.*, **24**, 3181-3184.
4. Klemp, D., D. Kley, F. Kramp, H.J. Buers, G. Pilwat, F. Flocke, H.W. Paetz, and A. Volz-Thomas, 1997: Long-term measurements of light hydrocarbons (C₂-C₅) at Schauinsland (Black Forest). *J. Atmos. Chem.*, **28**, 135-171.
5. Flocke, F., A. Volz-Thomas, and D. Kley, 1998: Long-term Measurements of Alkyl Nitrates in Southern Germany. Part I: General Behavior, Seasonal and Diurnal Variation. *J. Geophys. Res.*, **103**, 5729-5746.
6. Flocke, F., E. Atlas, S. Madronich, S. S.M., K. Aikin, J. J. Margitan, and T. v.Bui, 1998: Observations of methyl nitrate in the lower stratosphere during STRAT: Implications for its gas phase production mechanisms. *Geophys. Res. Lett.*, **25**, 1891-1894.
7. Schauffler, S. M., E. Atlas, F. Flocke, R. A. Lueb, V. Stroud, and W. Travnicek, 1998: Measurements of bromine-containing organic compounds at the tropical tropopause. *Geophys. Res. Lett.*, **25**, 317-320.
8. Weinheimer, A. J., D. D. Montzka, T. L. Campos, J. G. Walega, B. A. Ridley, S. G. Donnelly, E. R. Keim, L. A. D. Negro, M. H. Proffitt, J. J. Margitan, K. A. Boering, A. E. Andrews, B. C. Daube, S. C. Wofsy, B. E. Anderson, J. E. Collins, G. W. Sachse, S. A. Vay, J. W. Elkins, P. R. Wamsley, E. L. Atlas, F. Flocke, S. Schauffler, C. W. Webster, R. D. May, M. Loewenstein, J. R. Podolske, T. P. Bui, K. R. Chan, S. W. Bowen, M. R. Schoeberl, L. R. Lait, and P. A. Newman, 1998: Comparison between DC-8 and ER-2 species measurements in the tropical middle troposphere: NO, NO_y, O₃, CO₂, CH₄, and N₂O. *J. Geophys. Res.*, **103**, 22087-22096.
9. Wennberg, P. O., T. F. Hanisco, L. Jaegle, D. J. Jacob, E. J. Hints, E. J. Lanzendorf, J. G. Anderson, R.-S. Gao, E. R. Keim, S. G. Donnelly, L. A. DelNegro, D. W. Fahey, S. A. McKeen, R. J. Salawitch, C. R. Webster, R. D. May, R. L. Herman, M. H. Proffitt, J. J. Margitan, E. Atlas, F. Flocke, S. M. Schauffler, C. T. McElroy, J. C. Wilson, C. A. Brock, and T. P. Bui, 1998: Hydrogen radicals, nitrogen radicals, and the production of ozone in the middle and upper troposphere. *Science*, **279**, 49-53.
10. Blake, N. J., D. R. Blake, O. W. Wingenter, B. C. Sive, C. H. Kang, D. C. Thornton, A. R. Bandy, E. Atlas, F. Flocke, J. M. Harris, and F. S. Rowland, 1999: Aircraft measurements of the latitudinal, vertical, and seasonal variations of NMHCs, methyl nitrate, methyl halides and DMS during ACE-1. *J. Geophys. Res.*, **104**, 21803-21818.

11. Flocke, F., R. L. Herman, R. J. Salawitch, E. Atlas, C. R. Webster, S. M. Schauffler, R. A. Lueb, R. D. May, E. J. Moyer, K. H. Rosenlof, D. C. Scott, D. R. Blake, and T. P. Bui, 1999: An examination of chemistry and transport processes in the tropical lower stratosphere using observations of long-lived and short-lived compounds obtained during STRAT and POLARIS. *J. Geophys. Res.*, **104**, 26625-26642.
12. Gregory, G. L., D. J. Westberg, M. C. Shipman, D. R. Blake, E. L. Atlas, F. Flocke, R. E. Newell, R. W. Talbot, B. G. Heikes, G. W. Sachse, B. A. Anderson, and D. C. Thornton, 1999: Chemical characteristics of Pacific tropospheric air in the region of the Intertropical Convergence Zone and South Pacific Convergence Zone. *J. Geophys. Res.*, **104**, 5677-5696.
13. Keim, E. R., S. A. McKeen, R. S. Gao, S. G. Donnelly, R. C. Wamsley, L. A. DelNegro, D. W. Fahey, T. F. Hanisco, E. J. Lanzendorf, M. H. Proffitt, J. J. Margitan, E. J. Hintsa, L. Jaegle, C. R. Webster, R. D. May, D. C. Scott, R. J. Salawitch, J. C. Wilson, C. T. McElroy, E. L. Atlas, F. Flocke, and T. P. Bui, 1999: NO_y partitioning from measurements of nitrogen and hydrogen radicals in the upper troposphere. *Geophys. Res. Lett.*, **26**, 51-54.
14. Schauffler, S. M., E. L. Atlas, D. R. Blake, F. Flocke, X. X. Tie, R. A. Lueb, J. M. Lee-Taylor, V. Stroud, and W. Travnicek, 1999: Distributions of brominated organic compounds in the troposphere and lower stratosphere. *J. Geophys. Res.*, **104**, 21513-21535.
15. Schultz, M. G., D. J. Jacob, Y. Wang, J. A. Logan, E. L. Atlas, D. R. Blake, N. J. Blake, J. D. Bradshaw, E. V. Browell, M. A. Fenn, F. Flocke, G. L. Gregory, B. G. Heikes, G. W. Sachse, S. T. Sandholm, R. E. Shetter, H. B. Singh, and R. W. Talbot, 1999: On the Origin of tropospheric ozone and NO_x over the tropical South Pacific. *J. Geophys. Res.*, **104**, 5829-5844.
16. Talbot, R. W., J. E. Dibb, E. M. Scheuer, Y. Kondo, M. Koike, H. B. Singh, L. B. Salas, A. Viggiano, J. Ballentine, D. R. Blake, N. J. Blake, E. Atlas, F. Flocke, D. J. Jacob, and L. Jaegle, 1999: Reactive nitrogen budget during the NASA SONEX mission. *Geophys. Res. Lett.*, **26**, 3056-3060.
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- Donnelly, V. Stroud, K. Johnson, R. Weaver, and F. C. Fehsenfeld, 2001: Observations of Peroxyacrylic Nitric Anhydride, APAN, during the TexAQs 2000 Intensive Experiment. *Geophys. Res. Lett.*, **28**, 4195-4198.
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 26. Simpson, I. J., S. Meinardi, D. R. Blake, N. J. Blake, F. S. Rowland, E. Atlas, and F. Flocke, 2002: A Biomass Burning Source of C1-C4 Alkyl Nitrates. *Geophys. Res. Lett.*, **29**, 2168, doi: 10.1029/2002GL016290.
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- A. Ridley, B. Wert, J. Walega, A. Weinheimer, D. Blake, B. Heikes, J. Snow, R. Talbot, and J. Dibb, 2003: Coupled evolution of BrOx-ClOx-HOx-NOx chemistry during bromine-catalyzed ozone depletion events in the arctic boundary layer. *J. Geophys. Res.*, **108**, doi:10.1029/2002JD002732.
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